PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	William C. Phillips; Alex C. Toy; Charles R. Lewis, Jr.; Mark E. Schommer; John W. Forsberg; David P. Olson	Confirmation No.	9353
Serial No.:	10/693,015	Customer No.:	28863
Filed:	October 24, 2003	Examiner:	Tammie K. Heller
Docket No.:	1023-292US01	Group Art Unit:	3766
Title:	NEUROSTIMULATOR PROGRAMMER WITH INTERNAL ANTENNA		

DECLARATION UNDER 37 C.F.R. 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We, Alex C. Toy and John W. Forsberg, declare as follows:

1. We are named inventors in above-referenced Patent Application Serial No.10/693,015.

2. We are employees of Medtronic Inc., the Assignee of record for the present application.

3. As evidenced by this Declaration and Exhibits A-E referenced by this Declaration, we conceived and reduced to practice the inventions set forth in claims 1, 2, 4-9, 11-13, 15-20 and 22-37 of this application prior to May 15, 2003.

Conception and Reduction to Practice

4. Exhibits A-E, attached to this Declaration, contain documents that were prepared prior to May 15, 2003. Medtronic Inc. confidential and proprietary information has been redacted from Exhibits A-E.

5. Exhibits A-E and this Declaration provide evidence of our conception and reduction to practice of the inventions set forth in pending claims 1, 2, 4-9, 11-13, 15-20 and 22-37 prior to May 15, 2003.

6. Exhibit A is a document that illustrates our work in conceiving and reducing to practice a programmer for a medical device that includes an internal antenna that defines an aperture, and a battery bay substantially aligned with the aperture of the antenna. Exhibit A is assigned document number 502814 and relates to a programmer with model number 37741. On sheet 1, Exhibit A illustrates an assembly view of the programmer for a medical device. Sheet 1 of Exhibit A illustrates that the programmer has a battery bay formed within a housing member (2) such that the battery bay extends into the programmer. Sheet 1 of Exhibit A also illustrates an internal antenna that defines an aperture placed about the battery bay within the housing member (2). On sheet 1, Exhibit A shows that the battery bay is aligned substantially concentrically with the aperture of the antenna. Furthermore, sheet 1 of Exhibit A shows that the battery bay extends at least partially into the aperture of the antenna.

On sheet 2, Exhibit A illustrates an assembled view of the programmer for a medical device. The fully assembled programmer shown on sheet 2 of Exhibit A includes the components illustrated on sheet 1 of Exhibit A assembled along the z-axis such that the first housing member (2) and the second housing member (1) substantially enclose the first circuit board (10) and the second circuit board (9). Within the fully assembled programmer shown on sheet 2 of Exhibit A, the first circuit board (10) is within the first housing member (2), the battery bay within the first housing member (2) is adjacent the first circuit board (10), and the second circuit board (9) is disposed over the first circuit board (10) within the first housing member (2). Sheet 2 of Exhibit A also shows a side view of the fully assembled programmer including an external antenna jack for receiving a plug connected to a cable of an external antenna.

7. Exhibit B is a document that describes our work in conceiving and reducing to practice a programmer for a medical device that includes an internal antenna that defines an aperture, and a battery bay substantially aligned with the aperture of the antenna. Exhibit B is titled "Certificate of Compliance," from Benchmark Electronics, Inc. Exhibit B states that the material and/or parts described in the document comply with document number 502814 (see Exhibit A) from Medtronic, Inc. Exhibit B further states that a purchase order was placed with Benchmark Electronics, Inc. to build the programmer for a medical device illustrated in document number 502814 (see Exhibit A). Exhibit B states that the programmer was manufactured and the completed order was shipped to Medtronic, Inc. prior to May 15, 2003.

8. Exhibit C is a document that describes our work in conceiving and reducing to practice a programmer for a medical device that includes an internal antenna that defines an aperture, and a battery bay substantially aligned with the aperture of the antenna. Exhibit C is titled "NS1 Patient Programmer Platform Phase-II Report." As stated on the page indicated to be "page 3 of 16," Exhibit C documents a meeting held prior to May 15, 2003 that communicated the completion of the platform hardware and software for a programmer with model number 37741 (see Exhibit A). Exhibit C includes slides of the NS1 Patient Programmer Platform Review presentation given at the meeting.

Slide 6, on the page of Exhibit C indicated to be "page 8 of 16," includes a photograph of a programmer that was built prior to May 15, 2003. The programmer is shown as partially disassembled. Slide 6 states that the platform design of the programmer includes a four color gray scale LCD and is AAA battery driven. The photograph illustrates a first circuit board connected to a second circuit board and a display mounted to the second circuit board. The photograph also illustrates a housing member of the programmer with a battery bay formed in the housing member and an internal antenna that defines an aperture placed about the battery bay within the housing member. The photograph shows that the battery bay is aligned substantially concentrically with the aperture of the antenna, and the battery bay extends at least partially into the aperture of the antenna. As shown in the photograph, the antenna comprises a loop-like shape that defines the aperture and comprises copper braid shielding substantially surrounding a plastic frame wound with conductive winding. The photograph further illustrates a pair of AAA

batteries removed from battery contacts within the battery bay. When inserted in the battery bay of the programmer, the AAA batteries have a "North-South" orientation inside the internal antenna.

9. Exhibit D is a document that describes our work in conceiving and reducing to practice a programmer for a medical device that include an internal antenna that defines an aperture, and a battery bay substantially aligned with the aperture of the antenna. Exhibit D is titled "Neuro Patient Programmer Platform Electrical DVT Report." As stated on the page indicated to be "page 3 of 49," Exhibit D documents the results of a design verification test (DVT) performed on a programmer with model number 37741 (see Exhibit A) prior to May 15, 2003. On the page indicated to be "page 5 of 49," Exhibit D presents a Test Results Summary section including a Table 1 that summarizes the results of all electrical design verification testing. Table 1 shows that the programmer, i.e., device under test (DUT), passed each of the applied tests.

On the page indicated to be "page 14 of 49," Exhibit D describes an External Antenna Interface Test that verifies the external antenna interface within the programmer (see sheet 2 of Exhibit A) meets the requirements specified in the PEM (Patent Electronic Module) Electrical Specification. Acceptance Criteria of the test require "[w]hen an external antenna is connected, there should be no downlink from the internal antenna," and "[w]hen an external antenna is connected, the [microprocessor] should detect that the antenna is connected." On the page indicated to be "page 15 of 49," Exhibit D indicates that the programmer passed the External Antenna Interface Test.

On the page indicated to be "page 44 of 49," Exhibit D describes a Telemetry Performance Test that verifies telemetry performance in terms of map area at a fixed distance meets the requirements specified in the PEM Electrical Specification. At the page indicated to be "page 45 of 49," Exhibit D includes Acceptance Criteria that set forth requirements for the map areas of telemetry performance for both an internal antenna and an external antenna. On the page indicated to be "page 45 of 49," Exhibit D indicates that the programmer passed the Telemetry Performance Test.

At the page indicated to be "page 46 of 49," Exhibit D provides plots of map areas of telemetry performance for an internal antenna within the programmer at a two distances from an

implantable neurostimulator. On the page indicated to be "page 47 of 49," Exhibit D provides plots of map areas of telemetry performance for an external antenna within the programmer at a two distances from the IPG. On the page indicated to be "page 48 of 49," Exhibit D includes a photograph (shown as Figures 4.6.1.7.5) of the test fixture during the Telemetry Performance Test and a photograph (shown as and 4.6.1.7.6) of the test fixture showing the programmer (DUT) on a surface above a neurostimulator (IPG).

10. Exhibit E is a document that describes our work in conceiving and reducing to practice a programmer for a medical device that include an internal antenna that defines an aperture, and a battery bay substantially aligned with the aperture of the antenna. Exhibit E is a plot titled "Batteries Oriented "North-South" Inside Antenna," created prior to May 15, 2003. A "North-South" orientation of batteries is illustrated in the photograph on slide 6, on the page of Exhibit C indicated to be "page 8 of 16," inside an antenna within a programmer with model number 37741 (see Exhibit A). In the plot, Exhibit E illustrates Downlink Amplitude of an antenna within a programmer over a range of H-Bridge Drive Frequencies when different components are included within an aperture of the antenna. The plot of Exhibit E shows that batteries placed within the aperture of the antenna cause the antenna to produce a lower downlink amplitude than freespace or battery contacts alone inside the antenna. The reduced downlink amplitude is caused by a load presented to the internal antenna by the batteries when oriented "North-South" inside the internal antenna.

11. In view of the content of Exhibits A-E, including the passages discussed above, it is clear that we conceived and reduced to practice the inventions defined by claims 1, 2, 4-9, 11-13, 15-20 and 22-37 prior to May 15, 2003.

We rely on Exhibits A, B and D as evidence that we conceived and reduced to practice the elements set forth in the claims 1, 5-9, 11-13, 18, 19, 23-30 and 34-37 prior to May 15, 2003.

With respect to claims 1 and 19, Exhibit B describes placing a purchase order and receiving a completed programmer for a medical device defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 1 of Exhibit A illustrates a programmer including an internal antenna that defines an aperture mounted within a programmer housing (2), and a

battery bay formed within the programming housing (2) that extends into the programmer in substantial alignment with the aperture of the internal antenna. Sheet 1 of Exhibit A also illustrates that the battery bay is substantially concentrically aligned with the aperture of the internal antenna and extends at least partially into the aperture of the internal antenna.

With respect to claims 5 and 23, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 2 of Exhibit A illustrates an assembled view of the programmer that includes the components illustrated on sheet 1 of Exhibit A assembled along the z-axis such that the first housing member (2) and the second housing member (1) substantially enclose the first circuit board (10) and the second circuit board (9). Within the fully assembled programmer shown on sheet 2 of Exhibit A, the first circuit board (10) is within the first housing member (2), the battery bay within the first housing member (2) is adjacent the first circuit board (10), and the second circuit board (9) is disposed over the first circuit board (10) within the first housing member (2).

With respect to claims 6 and 24, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 1 of Exhibit A illustrates that the first housing member (2) has a molded area that defines the battery bay, and that the battery bay defines an opening in the first housing member (2) such that a battery door (4) is placed over the opening in the first housing member (2). The opening in the first housing member (2) provides access to the battery bay when the programmer is fully assembled. Sheet 1 of Exhibit A also illustrates battery contacts within the battery bay to receive batteries placed in the battery bay via the opening in the first housing member (2).

With respect to claims 37, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 1 of Exhibit A illustrates a programmer including an internal antenna that defines an aperture mounted within a first housing member (2), a first circuit board (10), an internal antenna that defines an aperture mounted to the first circuit board (10), a battery bay formed in the first

housing (2) that extends into the programmer in substantial alignment with the aperture of the internal antenna, an access opening (4) in the first housing member (2) that provides access to the battery bay when the programmer is fully assembled, a second circuit board (9), and a second housing member (1). Within the fully assembled programmer shown on sheet 2 of Exhibit A, the first circuit board (10) is within the first housing member (2), the battery bay within the first housing member (2) is adjacent the first circuit board (10) and is substantially concentrically aligned with the aperture of the internal antenna, and the second circuit board (9) is disposed over the first circuit board (10) within the first housing member (2), and the second housing member (1) is disposed over the second circuit board (9) to substantially enclose the first and second circuit boards (10), (9).

With respect to claims 7, 8, 9, 12, 25, 26, 27, 29, 35 and 36, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 1 of Exhibit A illustrates that the internal antenna within the first housing member (2) comprises a three-pronged connector capable of coupling or mounting the internal antenna to the first circuit board (10) such that the internal antenna is displaced from the first circuit board (10). Sheet 2 of Exhibit A illustrates a fully assembled programmer that includes the components illustrated on sheet 1 of Exhibit A assembled along the z-axis such that a space between the internal antenna and the first circuit board (10) is substantially filled by the battery bay extending into the aperture of the internal antenna.

Sheet 1 of Exhibit A also illustrates that the internal antenna is mounted to the first circuit board (10) on a side of the first circuit board (10) opposite the second circuit board (9). Sheet 1 of Exhibit A shows that a display (12) is mounted to the second circuit board (9) on a side of the second circuit board (9) opposite the first circuit board (10). Sheet 1 of Exhibit A also illustrates an electrical interface between the first circuit board (10) and the second circuit board (9). In addition, sheet 1 of Exhibit A defines the first circuit board (10) as a telemetry circuit board, defines the second circuit board (9) as a digital circuit board, and defines the display (12) mounted to the second circuit board (9) as a LCD (liquid crystal display). The first circuit board (10) includes telemetry circuitry and the second circuit board (9) includes control circuitry to control the display (12) and the telemetry circuitry included in the first circuit board (10).

With respect to claims 13 and 30, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. Sheet 2 of Exhibit A illustrates a side view of a fully assembled programmer including an external antenna jack for receiving a plug connected to a cable that couples an external antenna to the programmer. On the page indicated to be "page 14 of 49," Exhibit D describes an External Antenna Interface Test that verifies the external antenna interface within the programmer meets the requirements specified in the PEM Electrical Specification. On the page indicated to be "page 15 of 49," Exhibit D indicates that the programmer passed the External Antenna Interface Test.

With respect to claims 11, 18, 28 and 34, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, and Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003. On the page indicated to be "page 44 of 49," Exhibit D describes a Telemetry Performance Test that verifies telemetry performance between a programmer and an implantable medical device. On the page indicated to be "page 45 of 49," Exhibit D indicates that the programmer passed the Telemetry Performance Test such that telemetry circuit within the programmer transmits signals to the implantable neurostimulator via the antenna and processes signals received from the implantable neurostimulator via the antenna.

Accordingly, as demonstrated by Exhibits A, B and D, we conceived and reduced to practice the inventions of claims 1, 5-9, 11-13, 18, 19, 23-30 and 34-37 prior to May 15, 2003.

We rely on Exhibits A, B, C and D as evidence that we conceived and reduced to practice the elements set forth in the claims 4, 12, 15-17, 22, 29 and 31-33 prior to May 15, 2003.

With respect to claims 4, 12, 22 and 29, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003, and Exhibit C describes a meeting held prior to May 15, 2003 that communicated the completion of the platform hardware and software for the programmer defined by Exhibit A. Slide 6, on the page of Exhibit C indicated to be "page 8 of 16,"includes a photograph of the programmer partially disassembled and describes the platform design of the programmer. Slide 6 illustrates a display mounted to a circuit board and defines the display as a "[f]our color gray

scale LCD." The photograph further illustrates a pair of AAA batteries removed from battery contacts within the battery bay and states that the programmer is "AAA battery driven." The photograph shows that the battery bay is sized to accommodate AAA batteries.

With respect to claims 15-17 and 31-33, Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003, and Exhibit C describes a meeting held prior to May 15, 2003 that communicated the completion of the platform hardware and software for a programmer defined by Exhibit A. The photograph on slide 6, on the page of Exhibit C indicated to be "page 8 of 16," also illustrates a housing member of the programmer with a battery bay formed in the housing member and an internal antenna that defines an aperture placed about the battery bay within the housing member. The photograph shows that the battery bay is aligned substantially concentrically with the aperture of the antenna, and the battery bay extends at least partially into the aperture of the antenna. As shown in the photograph, the antenna comprises a loop-like shape that defines the aperture. The antenna comprises a plastic frame wound with conductive winding and copper braid shielding substantially surrounding the plastic frame and the conductive winding.

Accordingly, as demonstrated by Exhibits A, B, C and D, we conceived and reduced to practice the inventions of claims 4, 12, 15-17, 22, 29 and 31-33 prior to May 15, 2003.

We rely on Exhibits A, B, C, D and E as evidence that we conceived and reduced to practice the elements set forth in the claims 2 and 20 prior to May 15, 2003. Exhibit B describes placing a purchase order and receiving the completed programmer defined by Exhibit A prior to May 15, 2003, Exhibit D documents the results of a DVT performed on the programmer defined by Exhibit A prior to May 15, 2003, Exhibit C describes a meeting held prior to May 15, 2003 that communicated the completion of the platform hardware and software for the programmer defined by Exhibit A, and Exhibit E illustrates an affect of "North-South" oriented batteries placed inside an antenna within the programmer defined by Exhibit A.

The photograph on slide 6, on the page of Exhibit C indicated to be "page 8 of 16," illustrates a pair of AAA batteries that have a "North-South" orientation inside the internal antenna when inserted in the battery bay of the programmer. Exhibit E illustrates Downlink Amplitude of an antenna within a programmer over a range of H-Bridge Drive Frequencies when

different components are included within an aperture of the antenna. The plot of Exhibit E shows that batteries placed within the aperture of the antenna cause the antenna to produce a lower downlink amplitude than freespace or battery contacts alone inside the antenna. The reduced downlink amplitude is caused by a load presented to the internal antenna by the batteries when oriented "North-South" inside the internal antenna. Exhibit E illustrates that the battery bay illustrated in the photograph on slide 6, on the page of Exhibit C indicated to be "page 8 of 16,"is oriented such that batteries placed in the battery bay present a load to the internal antenna placed about the battery bay.

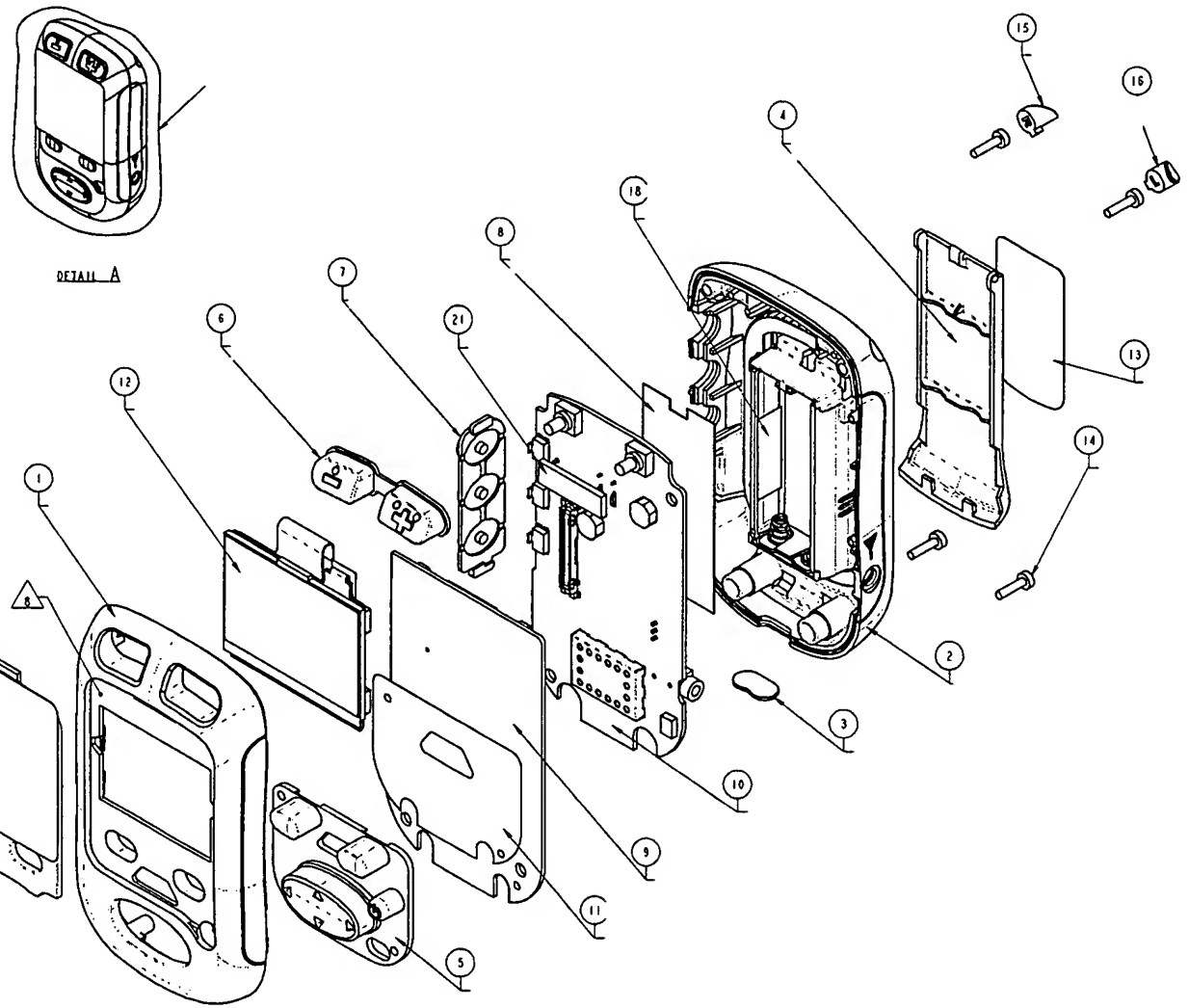
Accordingly, as demonstrated by Exhibits A, B, C, D and E, we conceived and reduced to practice the inventions of claims 2 and 20 prior to May 15, 2003.

We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 1/9/07 Signed: Alex C. Toy
Alex C. Toy

Date: 1/9/07 Signed: John W. Forsberg
John W. Forsberg

PART NO.	REV	ECO NO.	STATUS
502814-001	D	D02-4062	OBSOLETE
502814-002	B	D02-4062	ACTIVE



REVISIONS					
LTR	DESCRIPTION	ECN No.	DATE	BY	APVD
A				JJC	WCP
B				MJB	JWS
C				MJB	JWS
D				MJB	JWS
E				MJB	JWS

EXHIBIT A

Medtronic
MEDTRONIC NEUROLOGICAL MINNEAPOLIS, MINNESOTA USA

MEDTRONIC CONFIDENTIAL
THIS DOCUMENT IS THE PROPERTY OF MEDTRONIC, INC. THE INFORMATION CONTAINED HEREIN IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY MEDTRONIC, INC. IT IS NOT TO BE LOANED, COPIED, OR REPRODUCED IN ANY FORM, NOR IS ITS CONTENTS TO BE DISCLOSED TO OTHERS OUTSIDE OF MEDTRONIC, INC. OR ITS AUTHORIZED AFFILIATES WITHOUT WRITTEN PERMISSION.

UNSPECIFIED DRAWING PRACTICES PER ASME Y14.5M 1994

THIRD ANGLE PROJECTION

TITLE: PROGRAMMER ASSY. PATIENT, NSI

SCALE: DO NOT SCALE PRINT

DRAFTING: C. PETERS — DATE: 14DEC01

ENGINEERING: D. PHILLIPS

THE CAD DATA FOR THIS PART NUMBER CAN BE MADE AVAILABLE UPON REQUEST

X.X ±
X.XX ±
X.XXX ±
ANGLES ±

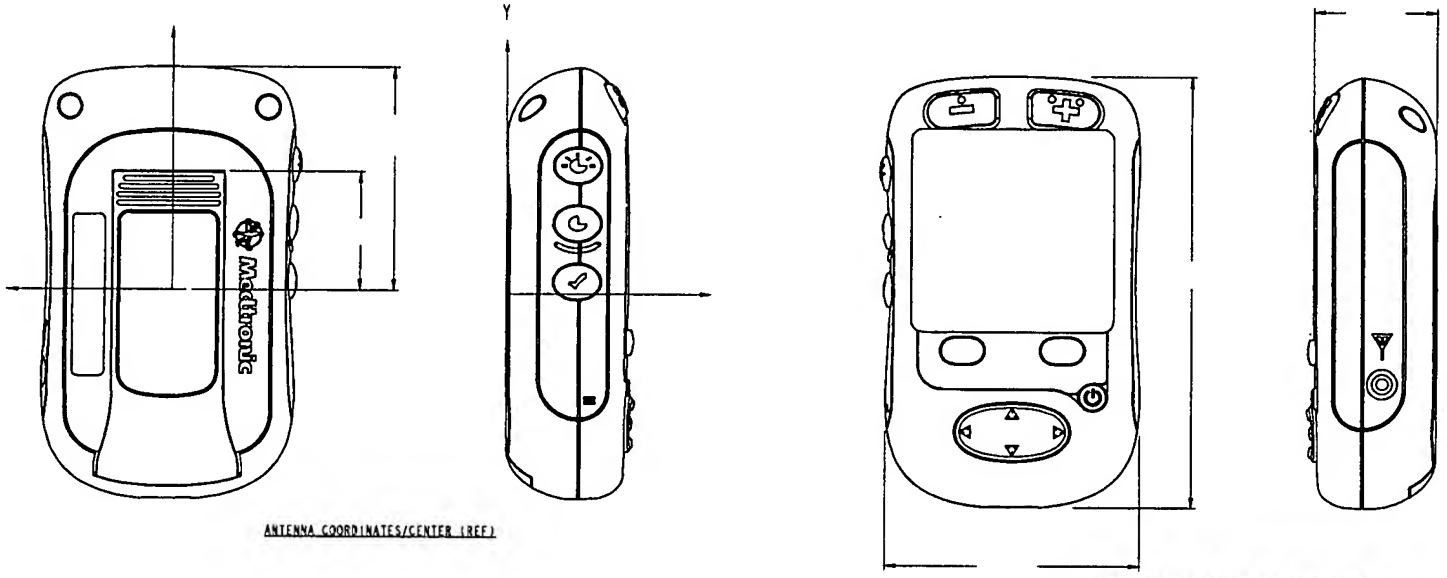
TYPE: .

FIRST DESIGNED FOR
MODEL: 97741 — SERV ASSY: 3774100

SIZE: D — DOCUMENT NUMBER: 502814 — REV: E — SHEET: 1 of 2

502814

PROE/ENGREED



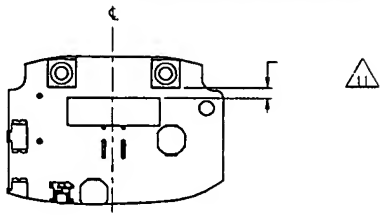


EXHIBIT A (cont.)

MEDTRONIC CONFIDENTIAL				
SIZE	PART NUMBER	REV	SHEET
D	502814	E	2

502814

EXHIBIT B

BENCHMARK ELECTRONICS, INC. WINONA DIVISION
WINONA, MN 55987

C E R T I F I C A T E O F

C O M P L I A N C E

The material and/or parts described below comply with:

MEDTRONIC, INC. P/N502814000

Results of tests performed are in our files and are available for your inspection at any reasonable time.

==========

Item Description . . . : MED+502814000 NS1 FINAL ASM

Purchase Order Number: 1040825

Quantity . . . . . : 1

Packing Slip Number. : 164674

Customer Order Number: 110676

Date Shipped . . . . :

BEI M.O. Number. . . : _____

Serial Number. . . . : NJD000001P

_____
Quality Assurance Department

26-01782-00 REV A

1 DOCUMENT PURPOSE

Document the completion of Phase-II for the NS1 patient programmer (model 37741) Meeting held on

2 ATTENDEES

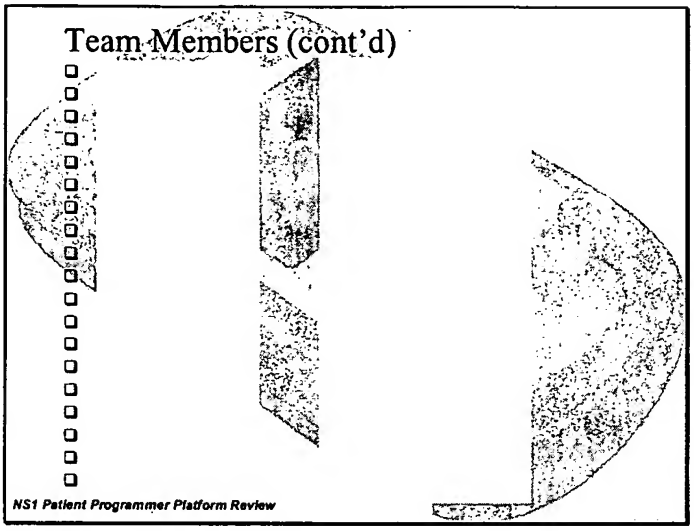
Alex Toy	
John Forsberg	

3 REFERENCE DOCUMENTS

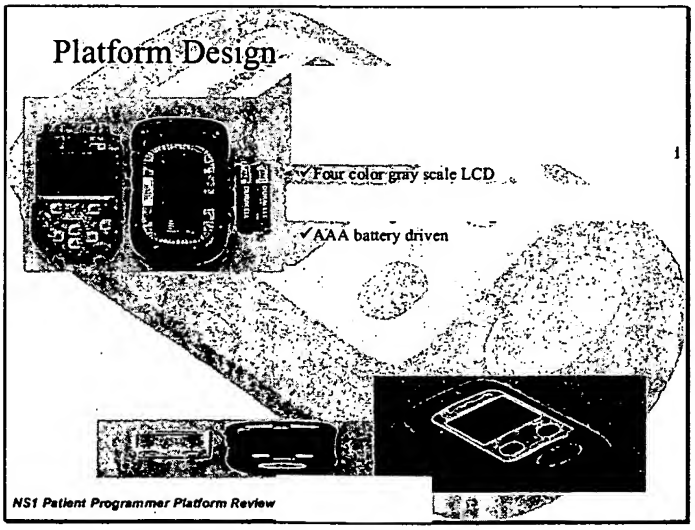
4 DISCUSSION

A Phase-II meeting was held on with the purpose of communicating the completion of the platform hardware and software for the NS1 patient programmer. The open project file actions are listed in section 5.

Slide 5



Slide 6



1 INTRODUCTION

This document is the electrical Design Verification Test (DVT) Report for the 37741 Patient Programmer Platform.

1.1 Purpose

The purpose of this report is to document the results of test plan

1.2 Scope

This report applies only to design verification testing of the

1.3 Document Overview

This document is organized as follows:

- Section 2 contains references and definitions.
- Section 3 contains a table with the list of tests, software revisions, sample sizes, and test results.
- Section 4 contains the results of the electrical design verification tests.

3 Test Results Summary

Table 1 summarizes the results of all electrical design verification testing. Section 4 details each test setup, criteria, and results.

- Test data is stored as 288117-70200.
- Table 1 indicates test name, sample size, DUT software revision, Test Script Software revision, test path, and results.
- Test paths are shown in section 3.1.

Table 1

Test Name	Sample Size	DUT Software Revision	Script Software Test Revision	Test Path	Results
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	22				PASS
	1				PASS

4.2.3 External Antenna Interface Test

4.2.3.1 *Objective*

To verify the external antenna interface meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification.

4.2.3.2 *Method and Equipment*

4.2.3.3 *Test Cases*

There are test cases using all combinations of test values below:

Parameter	Test Values	Units

4.2.3.4 *Acceptance Criteria*

- When an external antenna is connected, there should be no downlink from the internal antenna.

- When an external antenna is connected, the uP should detect that the antenna is connected.

External Antenna					
	Min	Max	Min	Max	Yes/No

4.2.3.5 *Test Setup*

1.
2.
3.
4.

5.

4.2.3.6 *Test Procedure*

1.

2.

3.

4.

4.2.3.7 *RESULTS* **PASS**

All devices met the acceptance criteria.

4.5.7.6 *Test Procedure*

1.
2.
3.
4.
5.
6.
7.

4.5.7.7 *RESULTS* **PASS**

All devices met the acceptance criteria.

	New-Battery FET (mV)											
	Ambient Temp				Low Temp				High Temp			
	Min	Max	Mean	Std dev	Min	Max	Mean	Std dev	Min	Max	Mean	Std dev

4.6 Telemetry Performance Tests

4.6.1 Telemetry Map Area at a Fixed Distance Test

4.6.1.1 *Objective*

To verify telemetry performance in terms of map area at a fixed distance meets the requirements specified in the *Telemetry Performance* section of the PEM Electrical Specification.

4.6.1.2 *Method and Equipment*

4.6.1.3 *Test Cases*

Parameter	Test Values	Units

There are test cases.

4.6.1.4 *Acceptance Criteria*

IPG	Antenna	Map Area @ 5cm

4.6.1.5 *Test Setup*

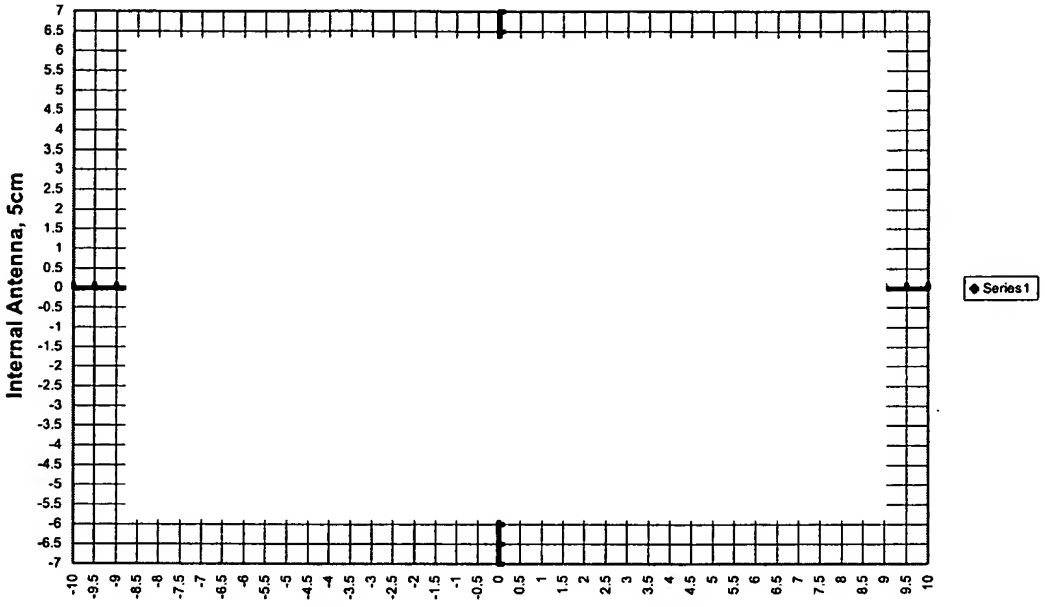
1.
2.

4.6.1.6 *Test Procedure*

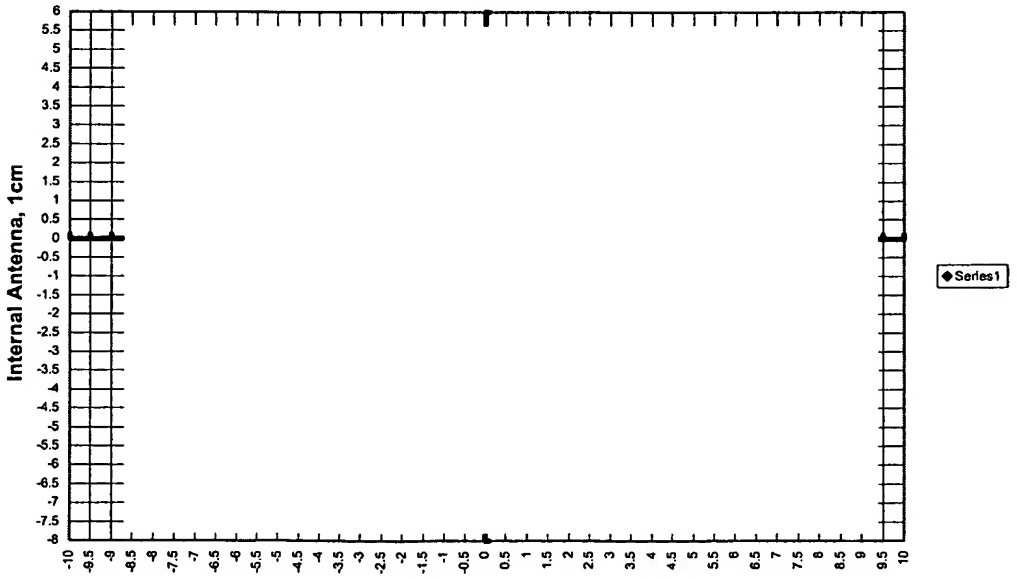
1.
2.
3.
4.
5.
6.
7.
8.

4.6.1.7 *RESULTS* **PASS**

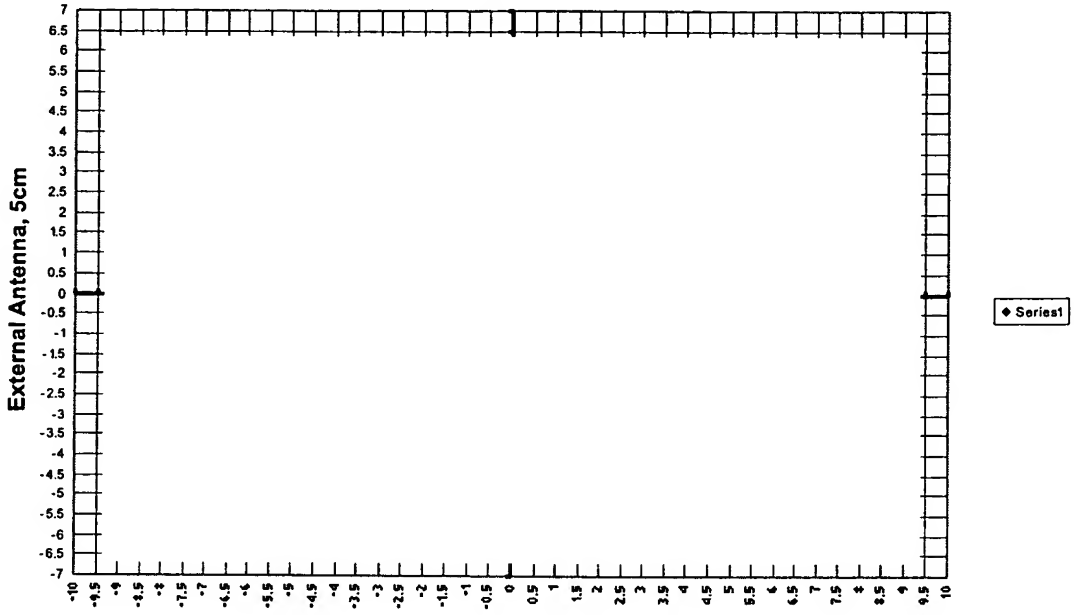
4.6.1.7.1 Internal Antenna Map @



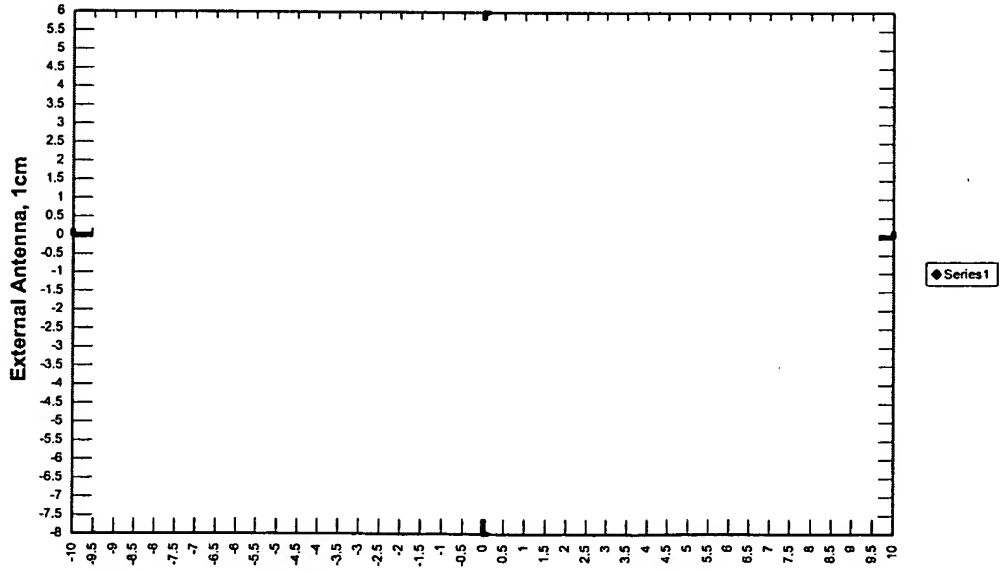
4.6.1.7.2 Internal Antenna @



4.6.1.7.3 External Antenna Map @

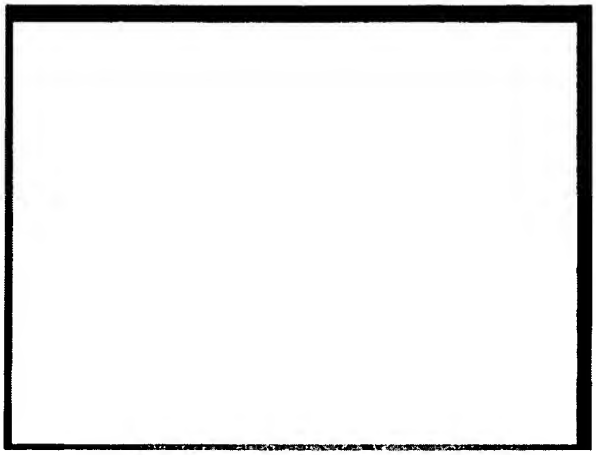


4.6.1.7.4 External Antenna @

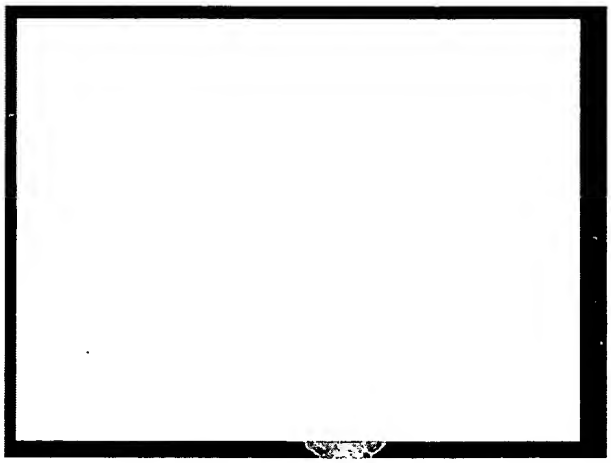


4.6.1.7.5 Photo of test fixture showing

in this photo.



4.6.1.7.6 Photo of test fixture showing DUT on it's surface above the IPG.



Batteries Oriented "North-South" Inside Antenna

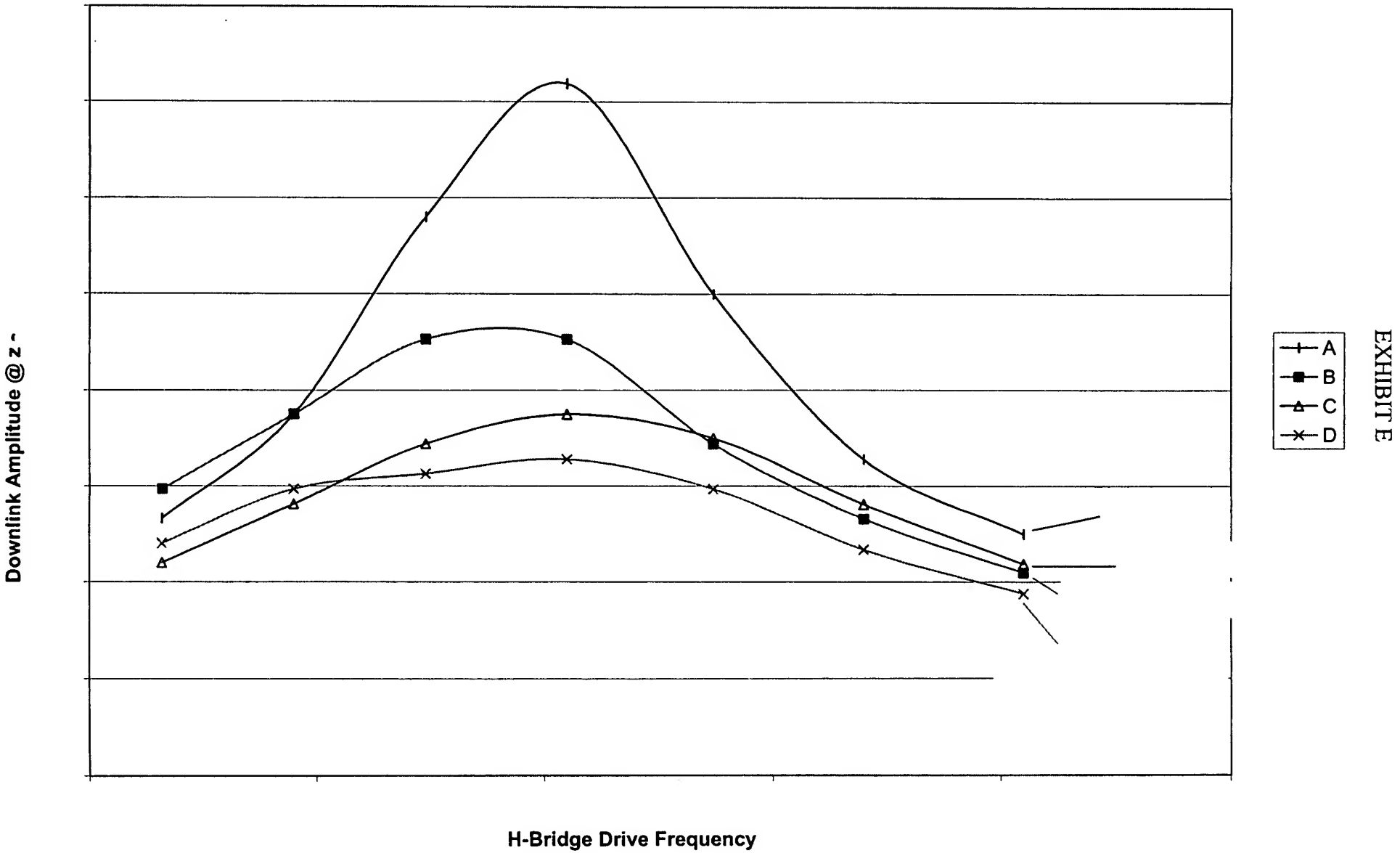


EXHIBIT E

Batteries North-South.xls:Plot 1

- Alex Toy